

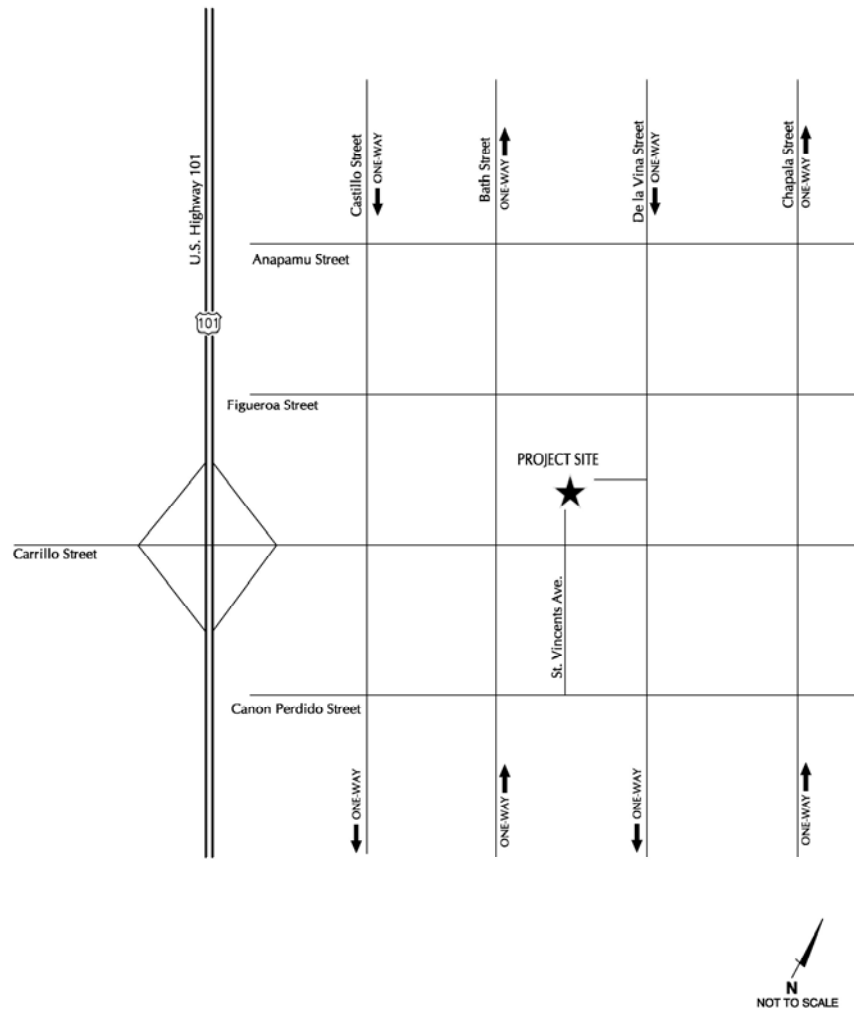
---

# RADIO SQUARE MIXED-USE PROJECT SANTA BARBARA, CALIFORNIA

---

## TRAFFIC AND CIRCULATION STUDY

---



---

September 15, 2006

ATE Project #05166.01

---

Prepared for:

Steve Yates  
TCMC  
1501 Chapala Street  
Santa Barbara, CA 93101



**ASSOCIATED TRANSPORTATION ENGINEERS**

100 N. Hope Avenue, Suite 4, Santa Barbara, CA 93110 • (805) 687-4418 • FAX (805) 682-8509

September 15, 2006

05166.01R03.doc

Steve Yates  
TCMC  
1501 Chapala Street  
Santa Barbara, CA 93101

***PHASE I TRAFFIC AND PARKING STUDY FOR THE  
RADIO SQUARE MIXED-USE PROJECT - CITY OF SANTA BARBARA***

Associated Transportation Engineers (ATE) has prepared the following Phase I Traffic and Parking Study for the Radio Square Mixed-Use Project. It is our understanding that this Phase I study will be submitted to the City of Santa Barbara as part of the project's application package.

We appreciate the opportunity to assist you with the project.

Associated Transportation Engineers

Scott A. Schell, AICP  
Principal Transportation Planner

## CONTENTS

INTRODUCTION .....	1
PROJECT DESCRIPTION .....	1
EXISTING CONDITIONS .....	1
Street Network .....	1
Transit Facilities.....	4
Bicycle Facilities.....	4
Intersection Operations.....	5
TRAFFIC IMPACT THRESHOLDS .....	7
Project-Specific Threshold.....	7
Cumulative Threshold.....	7
PROJECT TRIP GENERATION .....	7
MIXED USE TRIP GENERATION STUDIES .....	9
PROJECT TRIP DISTRIBUTION.....	10
Downtown Workforce Housing Trip Distributions .....	11
POTENTIAL IMPACTS.....	13
SITE ACCESS.....	13
Queuing Analysis .....	15
Parking Garage Operations .....	16
PARKING ANALYSIS.....	21
City Zoning Ordinance Requirements.....	21
STUDY PARTICIPANTS AND REFERENCES .....	22
TECHNICAL APPENDIX .....	23

## TABLES

Table 1	Existing Roadway Traffic Volumes .....	5
Table 2	Existing P.M. Peak Hour Levels of Service .....	6
Table 3	Trip Generation Calculations .....	9
Table 4	Peak Hour Trip Distribution Percentages .....	11
Table 5	Net Project-Added P.M. Peak Hour Trips .....	13
Table 6	Zoning Ordinance Parking Requirements.....	21

## FIGURES

Figure 1	Project Site Plan .....	2
Figure 2	Project Site Location/Existing Street Network.....	3
Figure 3	Project Trip Distribution Percentages and Trip Assignments .....	12
Figure 4	Carrillo Street Site Access.....	14
Figure 5	P.M. Peak Hour Driveway Volumes - With Left-Turn Access Allowed @ Carrillo St.....	17
Figure 6	P.M. Peak Hour Driveway Volumes - No Left-Turn Access Allowed @ .....	18
Figure 7	Existing P.M. Peak Hour Traffic Volumes - Carrillo St./St. Vincent Ave .....	19
Figure 8	Diverted P.M. Peak Hour Traffic Volumes With Restricted Left-Turns -.....	20

## INTRODUCTION

The following study contains an analysis of the potential traffic and circulation impacts associated with the Radio Square Mixed-Use Project. The report provides information relative to existing and future traffic conditions within the study-area adjacent to the project site, and identifies potential impact locations based on City thresholds. An analysis of site access and parking is also provided.

## PROJECT DESCRIPTION

The project site is located on the northwest corner of the Carrillo Street/De La Vina Street intersection in the City of Santa Barbara's downtown area. The site is currently occupied by a 20,244 gross square-foot (18,547 net SF) retail center which contains a Carrow's Restaurant, a donut shop, a liquor store/market and a mix of other retail uses. The existing facilities would be demolished and replaced with 55 condominium units, 15,849 gross SF (14,720 net SF) of retail space and 4,631 gross SF (3,649 net SF) of live-work commercial space. The total commercial space proposed is 20,480 gross SF (18,369 net SF). The live-work commercial space would be shared with 5 of the residential condominium units. Figure 1 illustrates the project site plan, and Figure 2 shows the location of the project site in the City's downtown area.

Access to the project site is proposed via an inbound-outbound driveway on Carrillo Street which would align approximately opposite Saint Vincent Avenue, and an outbound only driveway on De la Vina Street. The project is proposing to construct a median configuration on Carrillo Street that would allow left-turns into the project driveway, but restrict outbound movements to right-turns only. The proposed median would also restrict the Saint Vincent Avenue approach at Carrillo Street to right-turns in and right-turns out.

## EXISTING CONDITIONS

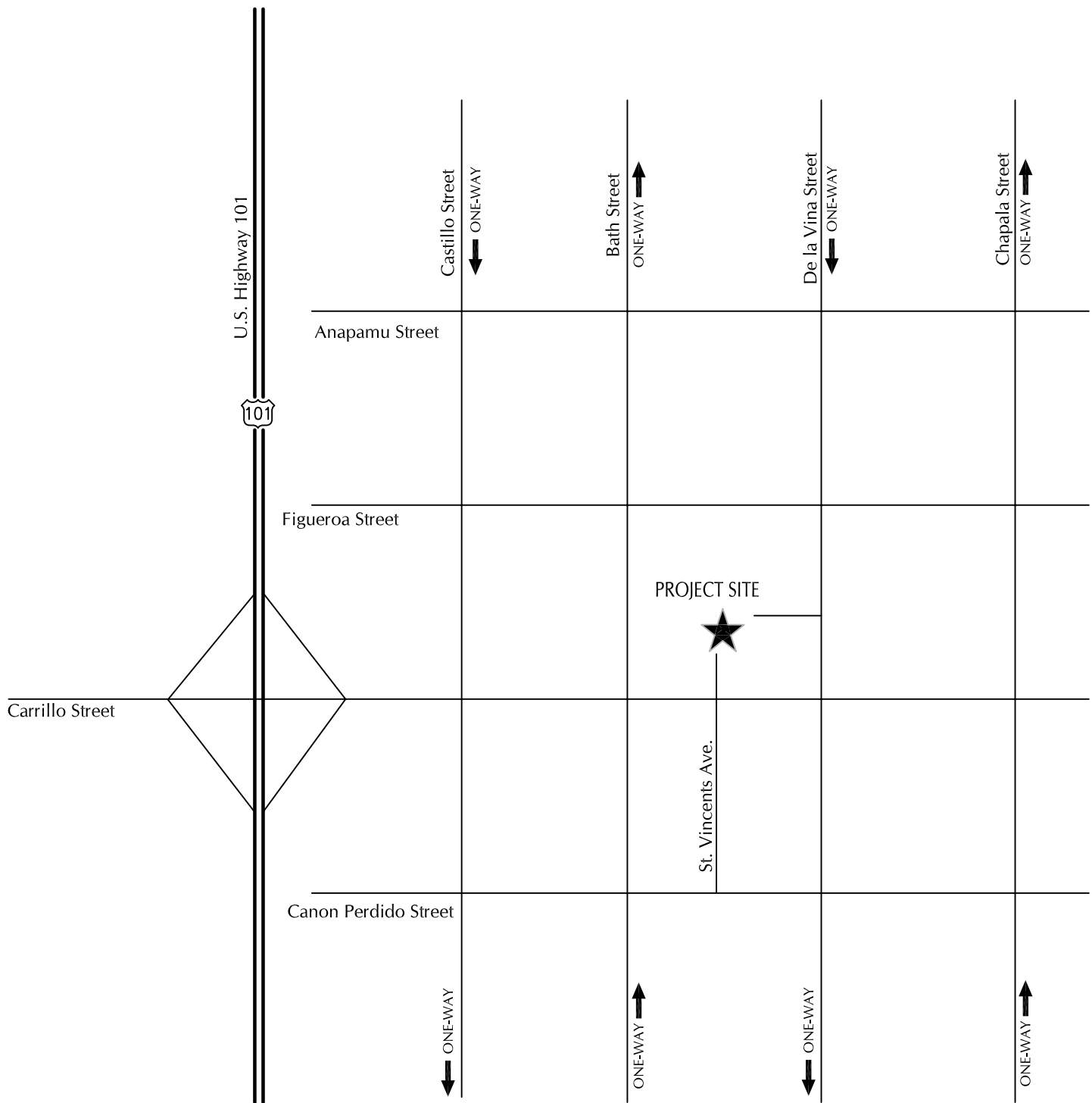
### Street Network

The project site is served by a network of highways, arterial streets and collector streets, as illustrated in Figure 2. The following text provides a brief discussion of the major components of the study-area street network.

U.S. Highway 101, located west of the project site, is a 6-lane freeway which connects the City of Santa Barbara with Goleta, Buellton and Santa Maria to the north; and Montecito, Carpinteria and Ventura to the south. U.S. 101 provides regional access to the project study area via the Carrillo Street interchange. Both the U.S. 101 Northbound and Southbound ramp intersections at the interchange are signalized.

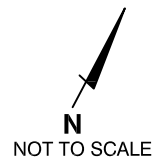
Carrillo Street, located along the project's southern frontage, is a four- to five-lane arterial that traverses the City's downtown commercial core. This east-west roadway includes left-turn channelization and signal control at the major intersections within the study area.





#### LEGEND

- XX - P.M. Peak Hour Volume
- (%) - Distribution Percentage



ASSOCIATED  
TRANSPORTATION  
ENGINEERS

#### PROJECT SITE LOCATION/EXISTING STREET NETWORK

FIGURE

2

MF #05166.01

De La Vina Street, located along the eastern frontage of the project site, is a one-way street (southbound) with two travel lanes in the downtown area of Santa Barbara. The Carrillo Street/De La Vina Street intersection is signalized. Access from the project site is proposed via an outbound only driveway on De La Vina Street. The driveway is proposed at approximately 300 feet north of Carrillo Street.

Chapala Street, located one block east of the project site, is a one-way street (northbound) with 2 to 3 lanes north of Carrillo Street. South of Carrillo Street, this roadway is a two-way road with 4 lanes. Traffic signals control the Carrillo Street/Chapala Street intersection.

Bath Street, located west of the project site, is part of the Bath Street-Castillo Street one-way couplet in the downtown area. This street runs northbound in the downtown area and provides one travel lane for motor vehicles and a Class II (on-street) bike lane. The intersection of Bath Street with Carrillo Street is signalized.

Castillo Street is a one-way street that runs southbound in the downtown area. Castillo Street provides one travel lane for motor vehicles and a Class II bike lane. The Castillo Street/Carrillo Street intersection is controlled by traffic signals.

### **Transit Facilities**

Carrillo Street is a major transit corridor in the downtown area of Santa Barbara and is served by several transit lines operated by the Metropolitan Transit District (MTD). The main MTD transit center for Santa Barbara is located one block east of the project site near the Carrillo Street/Chapala Street intersection. The nearest bus stops to the project site are located on Carrillo Street east and west of De La Vina Street. Lines 1, 8, 12, 17, and 24 stop at these locations.

### **Bicycle Facilities**

Several bicycle facilities are located within the study area. These include the on-street bike lanes (Class II) on portions of Carrillo Street, Bath Street, Castillo Street and State Street. Additional bicycle opportunities exist on the residential streets in the downtown area (Class III bike lanes).

### **Existing Roadway Volumes**

Existing average daily traffic (ADT) volumes were collected by Southland Car Counters for the segments of Carrillo Street and De La Vina Street adjacent to the project site. The volumes were collected for a 7-day period between May 17 and May 23, 2006. The results of the traffic counts are summarized in Table 1.

**Table 1**  
**Existing Roadway Traffic Volumes**

Location	Weekday		Saturday		Sunday	
	ADT	Peak Hour	ADT	Peak Hour	ADT	Peak Hour
De La Vina Southbound North of Carrillo Street	11,300	1,044	9,300	765	7,800	760
Carrillo St Total West of De La Vina St	33,200	2,525	30,700	2,367	23,500	2,135
Carrillo St Westbound West of De La Vina St	15,500	1,344	14,500	1,108	11,400	971
Carrillo St Eastbound West of De La Vina St	17,700	1,181	16,200	1,259	12,100	1,164

The data presented in Table 1 show that the segment of De La Vina Street north of Carrillo Street currently carries 11,300 ADT on weekdays, and the segment of Carrillo Street adjacent to the site carries 33,200 ADT on weekdays (17,700 ADT eastbound and 15,500 westbound). During the weekday P.M. peak hour, which occurs between 4:00 P.M. and 6:00 P.M., De La Vina Street carries 1,044 peak hour trips (PHT) and Carrillo Street carries 2,525 PHT (1,181 eastbound and 1,344 westbound). The count data show that traffic volumes are lower on Saturdays than weekdays, with an 8% to 18% reduction in daily volumes. The volumes drop even lower on Sundays, with a 30% reduction compared to weekday volumes.

The peak hour volumes on Carrillo Street vary by time of day and direction of flow. The eastbound volumes peak in the morning as workers commute into the downtown area of the City from the freeway interchange. The westbound volumes peak in the afternoon as the downtown workers travel back to the freeway. The overall volumes are highest during the P.M. peak hour period, which is typical for a commercial urban corridor.

### **Intersection Operations**

Because traffic flow on urban arterials is most constrained at intersections, detailed traffic flow analyses focus on the operating conditions of critical intersections during peak travel periods. In rating intersection operations, "Levels of Service" (LOS) A through F are used, with LOS A indicating free flow operations and LOS F indicating a complete breakdown in traffic flow (more complete definitions of levels of service are included in the Technical Appendix). The City considers LOS C with a volume-to-capacity ratio of 0.77 as the minimum acceptable operating standard for signalized intersections; and an average delay per vehicle of 22 seconds as the minimum standard for unsignalized intersections.

Traffic volume and level of service information for the study-area intersections was obtained from a variety of sources. The peak hour volumes for the Carrillo Street/De La Vina Street intersection were obtained from counts conducted by ATE in May of 2006. The level of service information for the remaining intersections were obtained from the City of Santa

Barbara Planning Commission staff report for the May 4, 2006 Level Of Service Workshop, and from the Santa Barbara County Association of Governments (SBCAG) Congestion Management Program (CMP) Annual Conformance Assessment reports (2003-2006). Levels of service for the study-area intersections were calculated based on the "Intersection Capacity Utilization" (ICU) methodology, which has been adopted by SBCAG and the City of Santa Barbara. The traffic count data and level of service calculation worksheets for the Carrillo Street/De La Vina Street intersection are contained in the Technical Appendix for reference.

Table 2 lists the existing P.M. peak hour levels of service for the study-area intersections.

**Table 2**  
**Existing P.M. Peak Hour Levels of Service**

Intersection	Control	P.M. Peak Hour V/C / LOS	Source	Year
Carrillo Street/Chapala Street	Signal	<b>NA/LOS D</b>	City	NA
Carrillo Street/De La Vina Street	Signal	0.68/LOS B	ATE Counts	2006
Carrillo Street/Bath Street	Signal	<b>NA/LOS D</b>	City	NA
Carrillo Street/Castillo Street	Signal	0.75/LOS C	SBCAG	2005
Carrillo Street/U.S. 101 NB Ramps	Signal	0.76/LOS C	SBCAG	2005
Carrillo Street/U.S. 101 SB Ramps	Signal	0.63/LOS B	SBCAG	2003

NA = V/C ratio and count date information not available for the LOS data provided by the City of Santa Barbara.

**Bolded** values exceed the City's 0.77/LOS C standard.

The data presented in Table 2 show that, based on the count data and LOS data available at this, two intersections in the Carrillo Street corridor currently operate in the LOS D range which exceeds the City's intersection operation standard of 0.77/LOS C. These include the Carrillo Street/Bath Street and Carrillo Street/Chapala Street intersections. The baseline count data for the intersections in the study-area will need to be updated for the expanded traffic study that will be completed for the project as part of the City's environmental review process.

## TRAFFIC IMPACT THRESHOLDS

### Project-Specific Threshold

The City's project-specific impact threshold states that if a development project would cause the V/C ratio at an intersection to exceed 0.77, or if the project would increase the V/C ratio at intersections which already exceed 0.77 by 0.01, the project's impact is considered significant.

### Cumulative Threshold

The City's cumulative impact threshold states that if a development project would add traffic to an intersection which is forecast to operate above V/C 0.77 with cumulative traffic volumes, the project's contribution is considered a significant cumulative impact. The distribution and impact analysis is based on the City's practice of following 5 vehicle trips or more through adjacent intersections. This provides a statistical certainty for project-generated traffic additions at critical intersections on a day-to-day basis.

## PROJECT TRIP GENERATION

A trip generation analysis was completed to determine the level of traffic that would be generated by the proposed mixed-use development compared to the level of traffic generated by the existing on-site uses. This analysis is intended to provide City staff with the traffic data needed to determine the level of environmental review required for the project. The comparative analysis was completed between the existing and proposed commercial uses, and between the existing commercial uses and the future commercial and residential uses. The trip generation rates and assumptions used to develop the trip estimates for the existing and proposed site uses are listed below.

It is noted that the trip generation analysis is based on gross building floor area, consistent with the ITE methodology. A figure illustrating the measurement formula used to develop the gross building floor area calculations is contained in the Technical Appendix.

### Existing Site Uses

**Retail Center.** The equation rates listed in the Institute of Transportation Engineers (ITE) Trip Generation manual (7th Edition)<sup>1</sup> for Shopping Centers (Land Use Code #820) were used to develop the trip generation estimates for the existing center. It is recognized that a portion of the vehicular trips to and from the existing center are pass-by trips rather than primary trips. Primary trips are made with the sole purpose of visiting the store, such as patrons traveling from home to the restaurant to dine and then traveling back home again. Pass-by trips already exist on the adjacent street system and stop at the site during their primary trip. For example, drivers traveling on Carrillo Street who stop at the store on their way home from work. A 34% pass-by trip adjustment was applied to the retail trips to account for the project's location

---

1 Trip Generation, Institute of Transportation Engineers, 7th Edition, 2003.

adjacent to Carrillo Street and De La Vina Street. This pass-by adjustment was derived from the data presented in the Institute of Transportation Engineers (ITE) Trip Generation Handbook (2nd Edition) for Shopping Centers.<sup>2</sup>

## **Proposed Project**

**Condominium Units.** The ITE Condominium rates (Land Use Code #230) were used for the market rate and affordable condominium units. For the five condominium live-work units, a 15% "mixed-use" adjustment was applied to the trip rates. The trip rates were adjusted to account for the live-work retail space, where the employees who work in the commercial areas would also reside in the on-site units and thus would not commute to and from the site.

**Retail Space.** The ITE equation rates for Shopping Centers (Land Use Code #820) were used for this component of the project. A 34% "pass-by" trip reduction adjustment, as cited above, was applied to the retail trips to account for the project's location adjacent to Carrillo Street and De La Vina Street.

**Live-Work Commercial Space.** The equation rates presented in the ITE Trip Generation Report for Shopping Centers were used for this component of the project. The 34% pass-by rate was applied to this component, as well as the 15% "mixed-use" adjustment to account for the live-work and mixed-use aspect of the project.

Table 3 compares the trip generation estimates developed for the existing and proposed site uses.

---

2      Trip Generation Handbook, Institute of Transportation Engineers, 2nd Edition, 2002.

**Table 3**  
**Trip Generation Calculations**

Land Uses	Size	Pass-By Mixed- Use%	ADT		A.M. Peak Hour		P.M. Peak Hour	
			Rate	Trips	Rate	Trips	Rate	Trips
<i>Existing Uses</i>								
Shopping Center	20,244 sf	34%	118.78	1,587	2.96	40	10.78	144
<i>Proposed Uses</i>								
<u>Commercial</u>								
Shopping Center	15,849 sf	34%	118.82	1,243	2.97	31	10.78	113
Live/Work Space	<u>4,631 sf</u>	34% + 15%	118.82	<u>281</u>	2.97	<u>7</u>	10.78	<u>25</u>
Subtotal Commercial	20,225 sf			1,524		38		138
<u>Residential</u>								
Condominiums	50 Units		5.86	293	0.44	22	0.52	26
Live-Work Condominiums	<u>5 Units</u>	15%	5.86	<u>25</u>	0.44	<u>2</u>	0.52	<u>2</u>
Subtotal Residential	55 Units			318		24		28
Total Proposed				1,842		62		166
<b>Net Change Commercial</b>				<b>-63</b>		<b>-2</b>		<b>-6</b>
<b>Net Change Total</b>				<b>+ 255</b>		<b>+ 22</b>		<b>+ 22</b>

Commercial square footage are for gross floor area.

The data presented in Table 3 show that development of the commercial component of the project would result in a net decrease of 63 ADT, 2 A.M. peak hour trips and 6 P.M. PHT. This decrease in traffic is due to a decrease in the size of the future retail uses compared to the existing retail uses, and a portion of the commercial area will be operated as live-work space shared with the on-site condominiums, thus reducing potential traffic generation. The commercial component of the project would therefore not have the potential to generate significant traffic impacts in the study area based on the City's thresholds of significance (5 or more P.M. peak hour trips added to an impacted intersection). The total project (commercial and residential) results in an increase of 255 ADT, 22 A.M. PHT and 22 P.M. PHT.

## MIXED-USE TRIP GENERATION STUDIES

The trip generation of mixed-use developments (as well as Transit Oriented Developments) has been the subject of several credible studies to determine actual versus estimated trip generation levels when compared to the ITE Trip Generation manual to take into account the synergy of a project's uses. The total trip generation is calculated by adding the trip generation of each individual use, the data for which was compiled from representative, non-mixed developments. Trip reductions are then assumed, resulting from pass-by trips and internal trips as reviewed above. Relevant conclusions from the most applicable studies are summarized below.

In the article "Trip Generation for Mixed-Use Developments"<sup>3</sup>, the Colorado/Wyoming Section of the Institute of Transportation Engineers endeavored to quantify actual trip generation of mixed-use developments throughout urban portions of Colorado. Driveway counts were performed at 9 locations and compared to the total ITE trip generation of each use. Interviews were also conducted to determine primary, secondary, and tertiary trip purposes to compare with the trip generation data. The Technical Committee determined that the actual trip generation was 8% less than the total daily trip generation estimates calculated using ITE rates, and the peak hour trip generation estimates were overestimated by 2.5%.

The Victoria (Canada) Transport Policy Institute compiled data from several sources for its Traffic Demand Management Encyclopedia<sup>4</sup> regarding trip generation for Transit Oriented Developments. The article summarizes reductions in vehicle travel according to land use design features. The data indicates that a residential mixed-use development can reduce vehicle travel by 5%. A residential mixed-use development located along a travel corridor (Radio Square is located along the Carrillo Street Corridor) can reduce vehicle travel by 7%. If located near a transit center (Radio Square is one block from the Santa Barbara MTD bus transit center), the residential mixed use development can reduce vehicle travel by 15%.

## PROJECT TRIP DISTRIBUTION

The net project-generated traffic was distributed onto the study-area street network based on the percentages shown in Table 4. These percentages were developed considering area population, surrounding land uses, existing traffic patterns and probable orientation of each project trip type.

---

3     Trip Generation for Mixed-Use Developments, ITE Journal, Institute of Transportation Engineers, February 1987.

4     Transit Oriented Development: Using Public Transit to create More Accessible and Livable Neighborhoods, TDM Encyclopedia, Victoria Transport Policy Institute, April 2006.

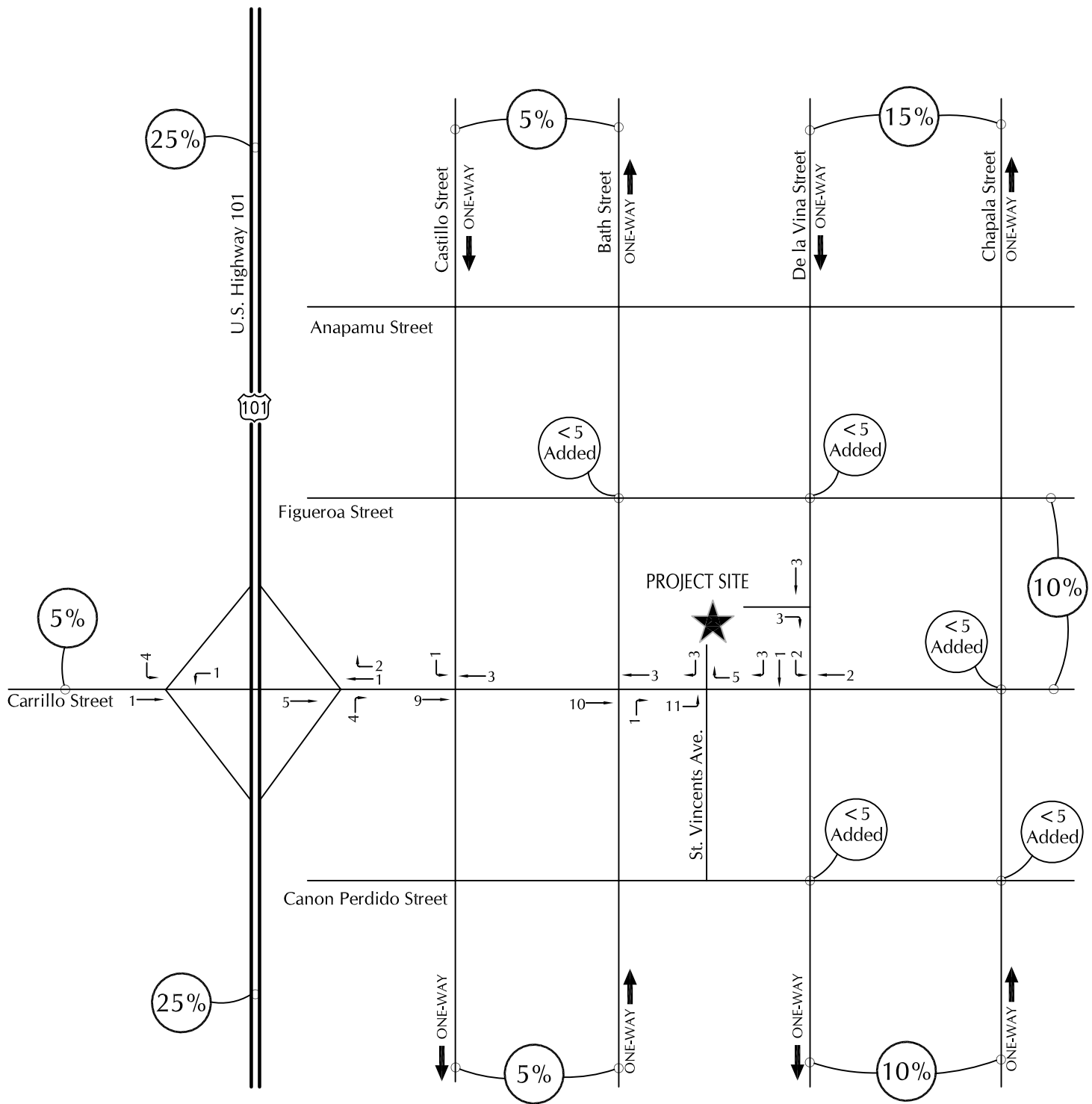
**Table 4**  
**Peak Hour Trip Distribution Percentages**

Origin/Destination	Direction	Distribution Percentage
U.S. Highway 101	North	25%
U.S. Highway 101	South	25%
De La Vina/Chapala Couplet	North	15%
De La Vina/Chapala Couplet	South	10%
Bath/Castillo Couplet	North	5%
Bath/Castillo Couplet	South	5%
Carrillo Street	East	10%
Carrillo Street	West	5%
<b>TOTAL</b>		<b>100%</b>

The net trips generated by the project were assigned to the study-area intersections based on the percentages shown in Table 4 and illustrated in Figure 3. As noted previously, it is the City's policy to assign 5 or more peak hour trips through adjacent intersections to determine the potential traffic impacts of proposed developments. This approach provides statistical certainty in determining the intersections which could potentially be impacted by the project. Figure 3 shows the project-added traffic at the intersections in the study-area where 5 or more peak hour trips are added.

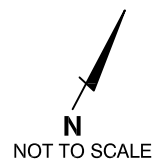
### **Downtown Workforce Housing Trip Distributions**

The City of Santa Barbara encourages workforce housing in the downtown area by offering affordable homes to downtown employees. This encourages travel by foot and mass transit, thereby reducing traffic on arterial streets. There are fewer commuter/regional trips as well, resulting in a more local distribution. Bolstered by accessibility to commercial venues in mixed-use developments, trips stay within the downtown area and reduce impacts to regional facilities. Given the location of the Radio Square Project and the type of development (mixed-use commercial and affordable housing), there is potential for this kind of redistribution of trips. With more foot and mass transit traffic, fewer automobile trips would use the downtown street network, and fewer trips would be sent to U.S. 101. Currently, the trip distribution above assumes a worst-case assignment and does not take into account the trip reduction benefits of workforce housing.



#### LEGEND

- XX - P.M. Peak Hour Volume
- % - Distribution Percentage



ASSOCIATED  
TRANSPORTATION  
ENGINEERS

#### PROJECT TRIP DISTRIBUTION PERCENTAGES AND TRIP ASSIGNMENTS

FIGURE

3

MF #05166.01

## POTENTIAL IMPACTS

Table 5 shows the project-added P.M. peak hour trips at each intersection in the project area.

**Table 5**  
**Net Project-Added P.M. Peak Hour Trips**

<b>Intersection</b>	<b>P.M. Peak V/C / LOS</b>	<b>Project-Added Trips</b>
Carrillo St/Chapala St	NA/LOS D	< 5 Trips
Carrillo St/De La Vina St	0.68/LOS B	8 Trips
Carrillo St/Bath St	NA/LOS D	14 Trips
Carrillo St/Castillo Street	0.75/LOS C	13 Trips
Carrillo St/U.S. 101 NB Ramps	0.76/LOS C	12 Trips
Carrillo St/U.S. 101 SB Ramps	0.63/LOS B	6 Trips
De La Vina/Figueroa St	NA	< 5 Trips
Bath St/Figueroa St	NA	< 5 Trips
Chapala St/Canon Perdido St	NA	< 5 Trips
De La Vina/Canon Perdido St	NA	< 5 Trips

NA = Existing ICU and/or LOS data for these intersections not available.

The data presented in Table 5 show that the project would add 5 or more peak hour trips to five intersections in the study area. Based on the City's 5-trip standard, these intersections will require further analysis when the environmental documents are prepared for the project to determine if the project would generate project-specific and cumulative impacts. The study should collect new baseline count data and provide cumulative forecasts and levels of service for these intersections.

## SITE ACCESS

Access to the project site is proposed via an inbound-outbound driveway on Carrillo Street and an outbound only driveway on De la Vina Street. As currently proposed, the Carrillo Street driveway would be designed to allow left-turns and right-turn into the site from Carrillo Street, but would be configured with a channelizing median to allow only right-turns out of the site (no left-turns onto Carrillo Street), shown in Figure 4.



Figure 5 shows the turning movements at the project driveways assuming the proposed access plan. The project would generate 80 left turns from eastbound Carrillo Street into the project site during the P.M. peak hour period. This traffic would be required to use a more circuitous route if the left-turn access were not provided, routing traffic through the adjacent residential neighborhood as shown in Figure 6. Instead of turning left from Carrillo directly into the site, that traffic would turn left at Bath Street, travel to West Figueroa Street and turn right, travel on West Figueroa Street and turn right on De la Vina, travel on De la Vina and turn right on Carrillo Street and then travel on Carrillo Street to enter the site at the proposed driveway. The more circuitous access as such would result in an increase in traffic of about 885 ADT using the alternative route through the adjacent residential neighborhood to reach the site. Traffic at the Bath Street/Figueroa Street, De La Vina Street/Figueroa Street, and De La Vina Street/Carrillo Street intersections would also increase as a result. Allowing left-turns from Carrillo Street into the project site would therefore be the most direct route.

The proposed median configuration would restrict the Saint Vincent Avenue approach at Carrillo Street to right-turns in and right-turns out. ATE quantified the amount of traffic that would be affected by the Saint Vincent Avenue access restriction and the route diversions that would occur. As shown in Figure 7, there is a minor amount of traffic that would be affected by the proposed median configuration. There were 9 vehicles that turned left from the Saint Vincent Avenue during the P.M. peak period; and 1 vehicle that turned left onto Saint Vincent Avenue from westbound Carrillo Street. Figure 8 shows this traffic rerouting in the vicinity of the intersection. The 9 vehicles that turn left from the Saint Vincent Avenue are anticipated to use Canon Perdido Street to travel northbound on Bath Street to turn left onto westbound Carrillo Street. The 1 vehicle that turned left onto Saint Vincent Avenue from westbound Carrillo Street would turn left onto De la Vina Street and then turn right onto Canon Perdido Street to reach its destination. This minor diversion of traffic would not measurably affect the streets and intersections in the study area.

## Queuing Analysis

Given the location of the project driveway and the sizeable volumes on Carrillo Street during the peak hour periods, it is necessary for the project to store vehicles entering the garage without blocking traffic on Carrillo Street. A gate or kiosk will be located approximately 150 feet from street level at the bottom of the garage ramp. Using a design vehicle of 25 feet, the proposed underground parking ramp has sufficient space to queue six vehicles at the parking ticket dispenser or kiosk. With 120 vehicles forecasted to enter the project driveway during the P.M. peak hour, there would be an average of two vehicle arrivals per minute. Using a Poisson distribution<sup>5</sup> and assuming the arrivals are twice the average (a factor of 2, or 2 standard deviations on the probability curve), there would be a maximum of 4 arrivals during the P.M. peak hour. Therefore, the ability to queue six cars would be sufficient for the number of anticipated arrivals, provided a state-of-the-art ticket dispenser or manned kiosk

---

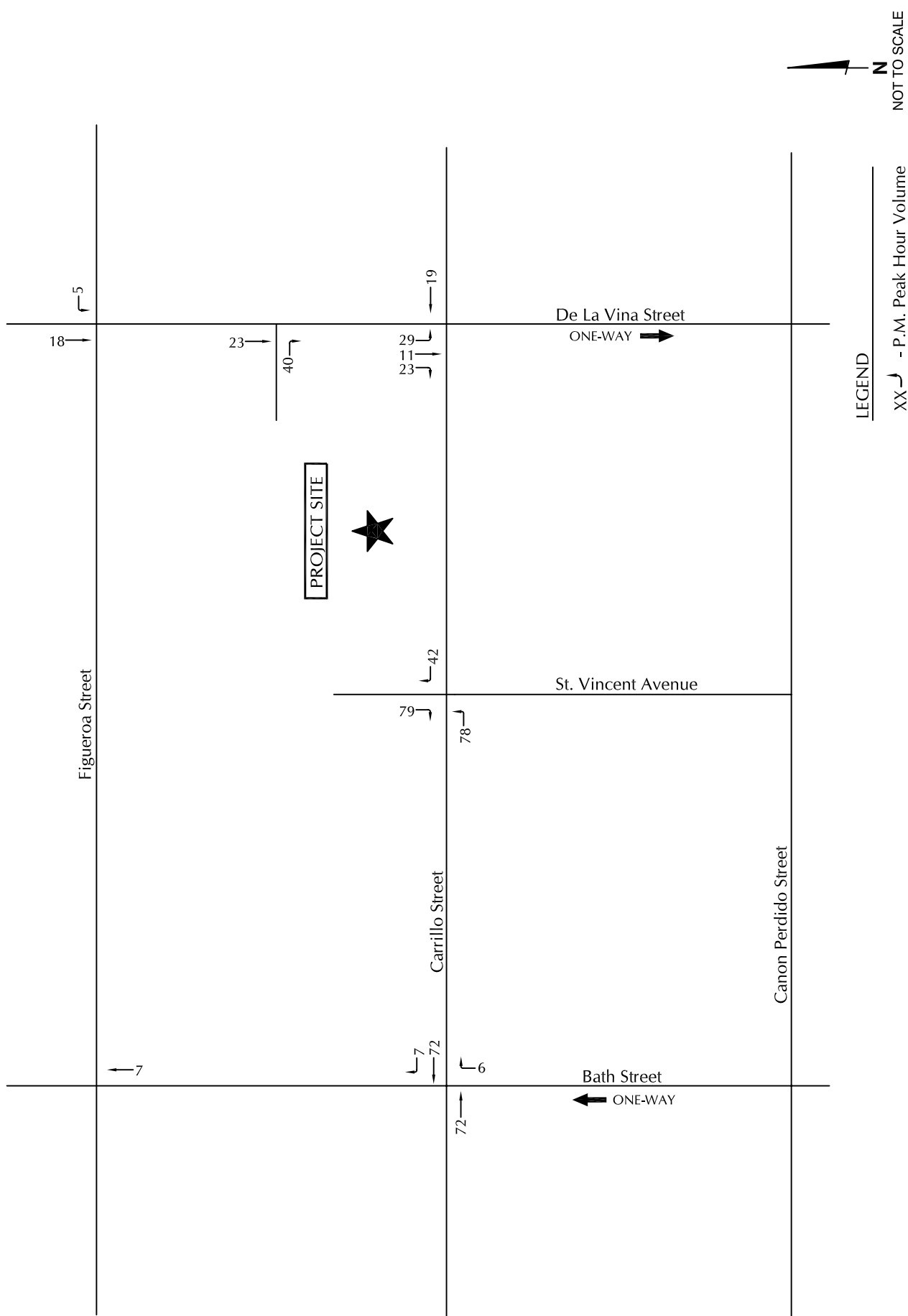
<sup>5</sup> The Poisson Distribution “expresses the probability of a number of events occurring in a fixed period of time if these events occur with a known average rate, and are independent of the time since the last event.” The distribution is expressed as a bell-shaped curve where the average is the highest point of the “bell”. <[http://en.wikipedia.org/wiki/Poisson\\_distribution](http://en.wikipedia.org/wiki/Poisson_distribution)>

is used so that vehicles are not unduly delayed. If necessary, the project could incorporate a "Lot Full" sign at the entrance to the garage so that queues do not develop due to the garage being full. The sign will be placed at a location deemed appropriate by City Staff.

### **Parking Garage Operations**

The parking garage for the Radio Square Project is proposed to be fee-based. Parking charges would be comparable to what is charged in other parking facilities in the downtown area. Gates would be either manned or automated, at the discretion of the owner. The top level of the garage would be reserved for commercial parking and residential guests. The lower level of the garage would be reserved for residents, with an automated electronic control gate for security. Parking would be provided to residents and employees at no cost. Residents and employees would also be provided with proximity cards or vehicle tags for automated entry and exit in order to expedite operations.

In the event that the parking garage is full, a "Lot Full" sign should be utilized to give motorists an early warning. Motorists could also be rerouted out of the garage to the exit on De La Vina by the parking attendant if the owner chooses to utilize a manned kiosk.



LEGEND

XX - P.M. Peak Hour Volume

NOT TO SCALE



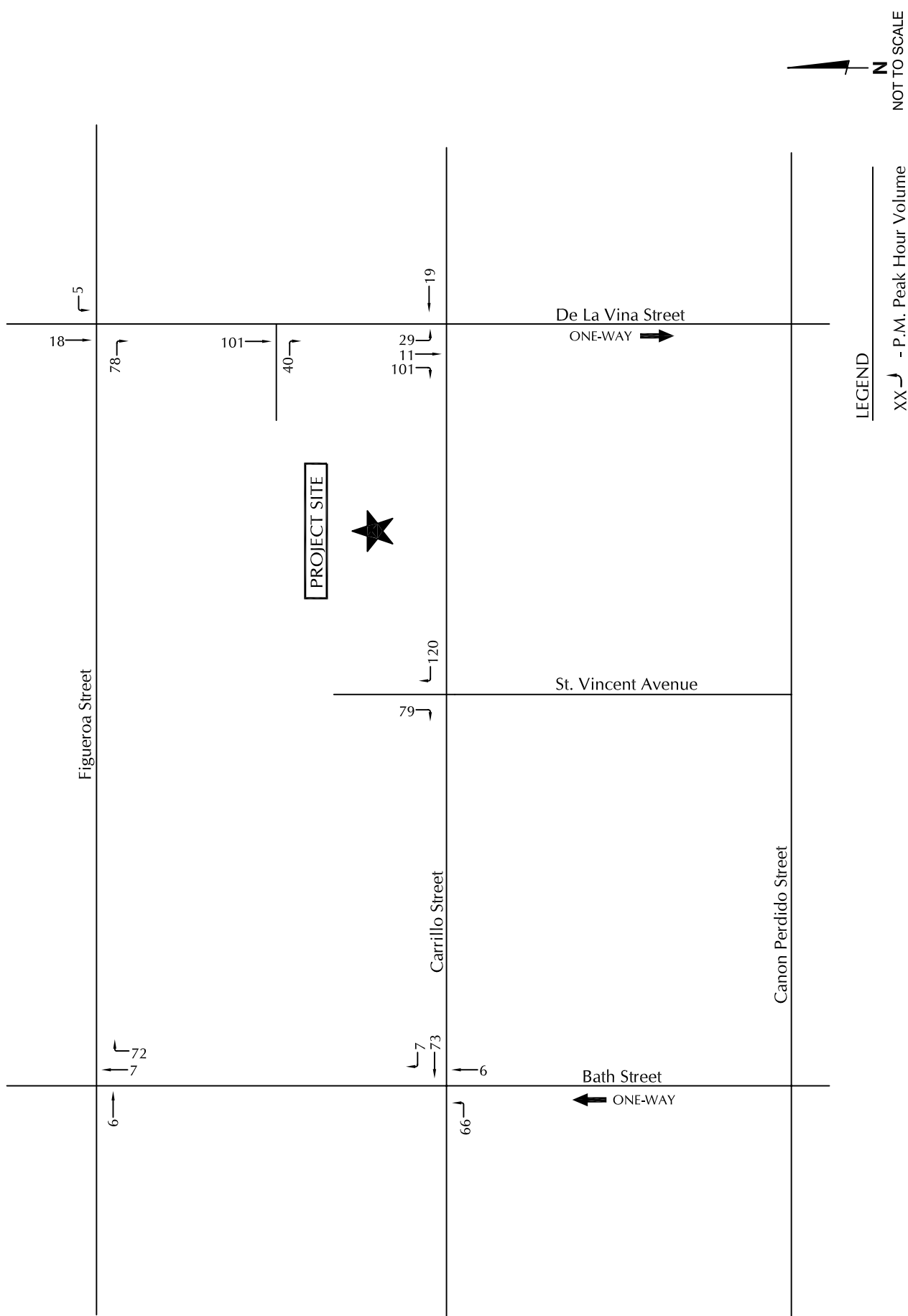
ASSOCIATED  
TRANSPORTATION  
ENGINEERS

P.M. PEAK HOUR DRIVEWAY VOLUMES - WITH LEFT TURN ACCESS ALLOWED AT CARRILLO STREET

FIGURE

5

JB #05166.01



ASSOCIATED  
TRANSPORTATION  
ENGINEERS

P.M. PEAK HOUR DRIVEWAY VOLUMES - NO LEFT TURN ACCESS ALLOWED AT CARRILLO STREET

FIGURE

6

JB #05166.01

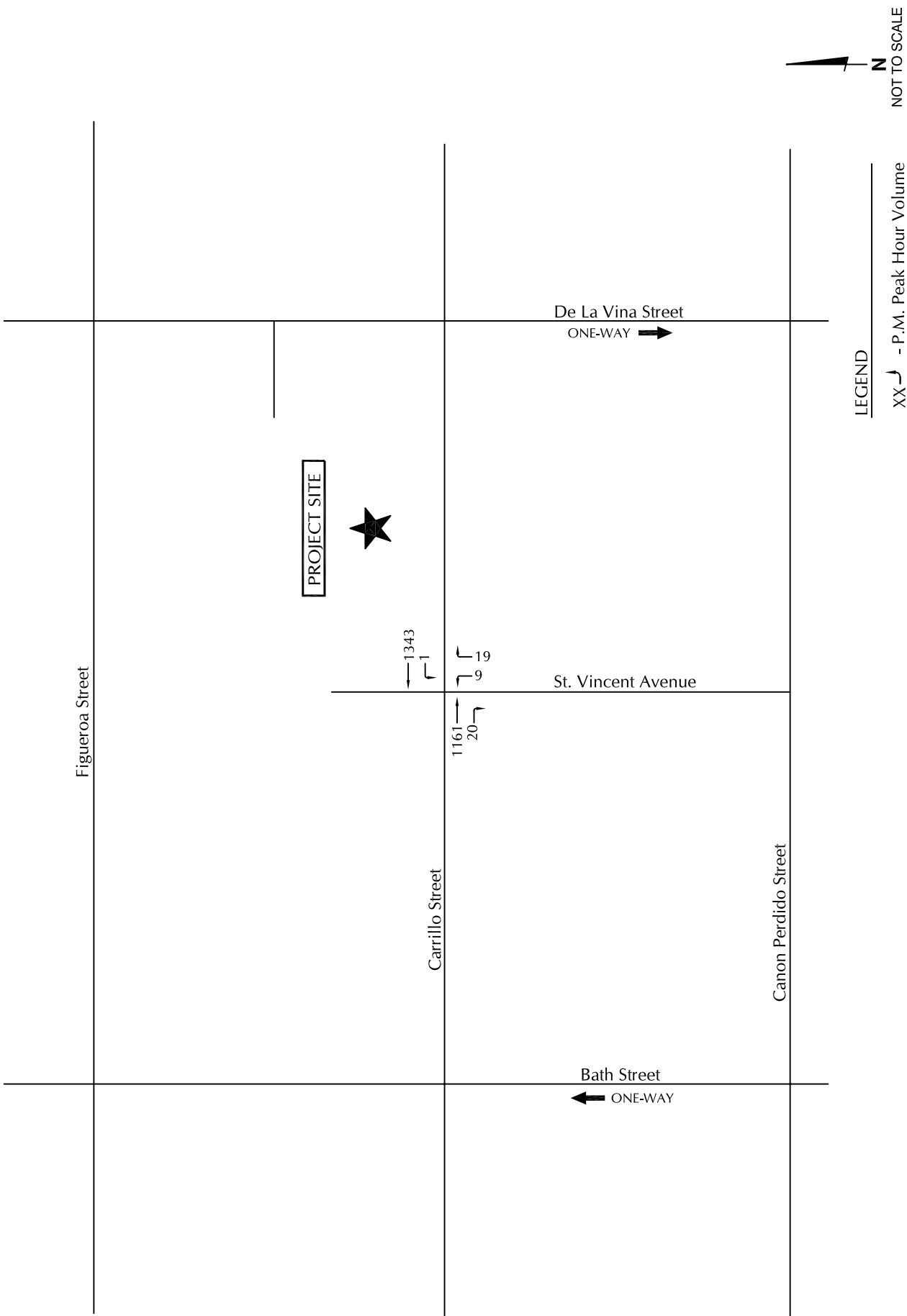




FIGURE 8

ASSOCIATED  
TRANSPORTATION  
ENGINEERS



## PARKING ANALYSIS

The following section reviews parking requirements for the Radio Square Mixed-Use Project per the Santa Barbara Zoning Ordinance. For the retail and live-work components, the required number of parking spaces were calculated using net building square footage.

### City Zoning Ordinance Requirements

The City's Zoning Ordinance parking requirement ratios for each of the project components are summarized below:

Studio Condominiums	1.25 spaces/unit
1 Bedroom Condominiums	1.50 spaces/unit
2 Bedroom Condominiums	2.00 spaces/unit
Visitors	1 space/4 units
Retail/Live-Work Buildings	1 space/250 SF

Based on these ratios, the project's Zoning Ordinance parking requirements were calculated as shown below in Table 6.

**Table 6**  
**Zoning Ordinance Parking Requirements**

Land Use	Size <sup>(a)</sup>	City Parking Ratio	Parking Space Requirement
Condominiums			
Studio	24 Units	1.25 space/unit	30 spaces
1-Bedroom	8 Units	1.50 space/unit	12 spaces
2-Bedroom	23 Units	2.00 Space/unit	46 spaces
Visitors	55 Units	1 space/4 units	<u>14 spaces</u>
			102 Spaces
Retail/Live-Work Space	18,369 sf	1 space/250 sf	73 Spaces
<b>Total Requirement</b>			<b>175 Spaces</b>

<sup>(a)</sup> Zoning ordinance calculations based on net building sizes.

The data presented in Table 2 show that the Zoning Ordinance requirement for the project is 175 parking spaces. The project is proposing to provide a minimum of 175 parking spaces and would therefore meet to zoning ordinance requirements.

## STUDY PARTICIPANTS AND REFERENCES

### Associated Transportation Engineers

Scott A. Schell, AICP, Principal Transportation Planner  
Justin S. Link, E.I.T., Transportation Engineer

### References

Congestion Management Program Annual Conformance Assessment Reports Santa Barbara County Association of Governments, 2003-2006.

City of Santa Barbara Planning Commission Staff Report, Level of Service Workshop, May 4, 2006.

Highway Capacity Manual, Transportation Research Special Report 209, National Research Council, Fourth Edition, 2000.

Transit Oriented Development: Using Public Transit to Create More Accessible and Livable Neighborhoods, TDM Encyclopedia, Victoria Transport Policy Institute, April 2006.

Trip Generation, Institute of Transportation Engineers, 7th Edition, 2003.

Trip Generation for Mixed-Use Developments, ITE Journal, Institute of Transportation Engineers, February 1987.

Trip Generation Handbook, Institute of Transportation Engineers, 2nd Edition, 2002.

Poisson Distribution, Wikipedia, <[http://en.wikipedia.org/wiki/Poisson\\_distribution](http://en.wikipedia.org/wiki/Poisson_distribution)>, 18 September 2006.

## TECHNICAL APPENDIX

### CONTENTS:

LEVEL OF SERVICE DEFINITIONS

TRAFFIC COUNT DATA

LEVEL OF SERVICE CALCULATION WORKSHEETS

1. Carrillo Street/De La Vina

RADIO SQUARE GROSS BUILDING FLOOR AREA CALCULATIONS

QUEUING CAPACITY DIAGRAM

## INTERSECTION LEVEL OF SERVICE DEFINITIONS

The ability of a roadway system to carry traffic is most often expressed in terms of "Levels of Service" (LOS) at intersections. LOS A through F are used, with LOS A indicating very good operations and LOS F indicating poor operations. More complete level of service definitions for intersections are listed in the following table.

LOS	Definition
A	Conditions of free unobstructed flow, no delays and all signal phases sufficient in duration to clear all approaching vehicles.
B	Conditions of stable flow, very little delay, a few phases are unable to handle all approaching vehicles.
C	Conditions of stable flow, delays are low to moderate, full use of peak direction signal phases is experienced.
D	Conditions approaching unstable flow, delays are moderate to heavy, significant signal time deficiencies are experienced for short durations during the peak traffic period.
E	Conditions of unstable flow, delays are significant, signal phase timing is generally insufficient, congestion exists for extended duration throughout the peak period.
F	Conditions of forced flow, travel speeds are low and volumes are well above capacity. This condition is often caused when vehicles released by an upstream signal are unable to proceed because of back-ups from a downstream signal.

Source: Highway Capacity Manual, 2000.

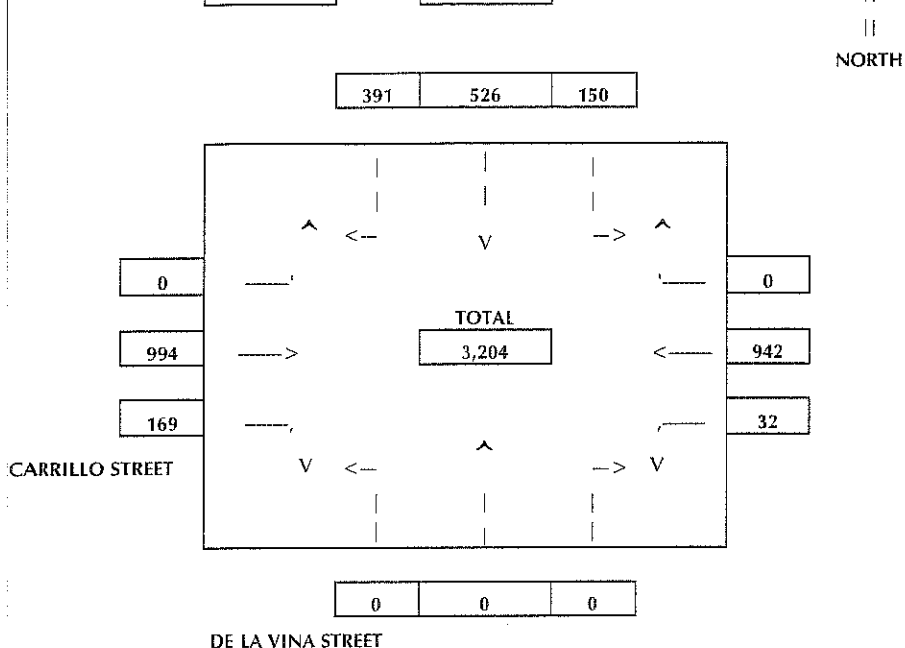
## **TRAFFIC COUNT DATA**

# ASSOCIATED TRANSPORTATION ENGINEERS

## INTERSECTION TURNING MOVEMENT SUMMARY

PROJECT: RADIO SQUARE	PROJECT #: 05116.01	COUNT DATE: 05-23-2006	FILE NAME: 01PM
N-S Approach: DE LA VINA STREET	COUNT TIME: 4:00 PM	TO 6:00 PM	
E-W Approach: CARRILLO STREET	CITY: SANTA BARBARA	WEATHER: SUNNY	

PEAK HOUR: 04:30 PM TO 05:30 PM



LTR	
APPROACH LANES	LTR
LTR	
LTR	
CONTROL TYPE: Stop - NB	

### ARRIVAL / DEPARTURE VOLUMES

1,067	0
1,333	974
1,163	1,144
727	0

TIME PERIOD			NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
From	--	To	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	VOLUMES
COUNT DATA															
04:00 PM	--	04:15 PM	0	0	0	28	111	99	0	220	31	6	194	0	689
04:15 PM	--	04:30 PM	0	0	0	62	216	180	0	457	66	14	394	0	1389
04:30 PM	--	04:45 PM	0	0	0	102	337	271	0	711	121	22	626	0	2190
04:45 PM	--	05:00 PM	0	0	0	135	459	360	0	971	170	29	843	0	2967
05:00 PM	--	05:15 PM	0	0	0	171	599	469	0	1210	204	38	1103	0	3794
05:15 PM	--	05:30 PM	0	0	0	212	742	571	0	1451	235	46	1336	0	4593
05:30 PM	--	05:45 PM	0	0	0	238	857	667	0	1725	268	59	1567	0	5381
05:45 PM	--	06:00 PM	0	0	0	277	954	743	0	1980	302	64	1801	0	6121

### TOTAL BY PERIOD

04:00 PM	04:15 PM	0	0	0	28	111	99	0	220	31	6	194	0	689
04:15 PM	04:30 PM	0	0	0	34	105	81	0	237	35	8	200	0	700
04:30 PM	04:45 PM	0	0	0	40	121	91	0	254	55	8	232	0	801
04:45 PM	05:00 PM	0	0	0	33	122	89	0	260	49	7	217	0	777
05:00 PM	05:15 PM	0	0	0	36	140	109	0	239	34	9	260	0	827
05:15 PM	05:30 PM	0	0	0	41	143	102	0	241	31	8	233	0	799
05:30 PM	05:45 PM	0	0	0	26	115	96	0	274	33	13	231	0	788
05:45 PM	06:00 PM	0	0	0	39	97	76	0	255	34	5	234	0	740

### HOURLY TOTALS

04:00 PM	05:00 PM	0	0	0	135	459	360	0	971	170	29	843	0	2967
04:15 PM	05:15 PM	0	0	0	143	488	370	0	990	173	32	909	0	3105
04:30 PM	05:30 PM	0	0	0	150	526	391	0	994	169	32	942	0	3204
04:45 PM	05:45 PM	0	0	0	136	520	396	0	1,014	147	37	941	0	3191
05:00 PM	06:00 PM	0	0	0	142	495	383	0	1,009	132	35	958	0	3154

## **LEVEL OF SERVICE CALCULATION WORKSHEETS**

### **1. Carrillo Street/De La Vina**

RADIO SQUARE # 05166.01

REF: EX 02PM

## INTERSECTION CAPACITY UTILIZATION WORKSHEET

COUNT DATE: MAY 2006

TIME PERIOD: P.M. PEAK HOUR

N/S STREET: DE LA VINA STREET

E/W STREET: CARRILLO STREET

CONTROL TYPE: SIGNAL

## TRAFFIC VOLUME SUMMARY

VOLUMES	NORTH BOUND			SOUTH BOUND			EAST BOUND			WEST BOUND		
	L	T	R	L	T	R	L	T	R	L	T	R
(A) EXISTING:	0	0	0	150	526	391	0	994	169	32	942	0
(B) PROJECT-ADDED	0	0	0	0	0	0	0	0	0	0	0	0
(C) SHORT-TERM CUM	0	0	0	0	0	0	0	0	0	0	0	0

## GEOMETRICS

LANE GEOMETRICS	NORTH BOUND			SOUTH BOUND			EAST BOUND			WEST BOUND		
	L	T	R	L	T	R	L	T	R	L	T	R

## TRAFFIC SCENARIOS

SCENARIO 1 = EXISTING VOLUMES (A)

SCENARIO 2 = EXISTING + PROJECT VOLUMES(A+B)

SCENARIO 3 = SHORT-TERM CUMULATIVE (C)

SCENARIO 4 = SHORT-TERM CUMULATIVE + PROJECT VOLUMES (B+C)

## LEVEL OF SERVICE CALCULATIONS

MOVE- MENTS	# OF LANES	CAPACITY	SCENARIO VOLUMES				SCENARIO V/C RATIOS					
			1	2	3	4	1	2	3	4		
NBL	0	0	0	0	0	0	-	-	-	-		
NBT	0	0	0	0	0	0	-	- *	- *	- *		
NBR	0	0	0	0	0	0	-	-	-	-		
SBL	1	1600	150	150	0	0	0.094	0.094	0.000 *	0.000 *		
SBT	2	3200	526	526	0	0	0.164	0.164	0.000	0.000		
SBR (a)	1	1600	321	321	0	0	0.201 *	0.201 *	0.000	0.000		
EBL	0	0	0	0	0	0	-	-	-	-		
EBT	2	3200	994	994	0	0	0.360 *	0.360 *	0.000 *	0.000 *		
EBR (b)	0	0	159	159	0	0	-	-	-	-		
WBL	1	1600	32	32	0	0	0.020 *	0.020 *	0.000 *	0.000 *		
WBT	3	4800	942	942	0	0	0.196	0.196	0.000	0.000		
WBR	0	0	0	0	0	0	-	-	-	-		
LOST TIME:							0.100 *	0.100 *	0.100 *	0.100 *		
TOTAL INTERSECTION CAPACITY UTILIZATION:							0.681	0.681	0.100	0.100		
SCENARIO LEVEL OF SERVICE:							B	B	A	A		

## NOTES:

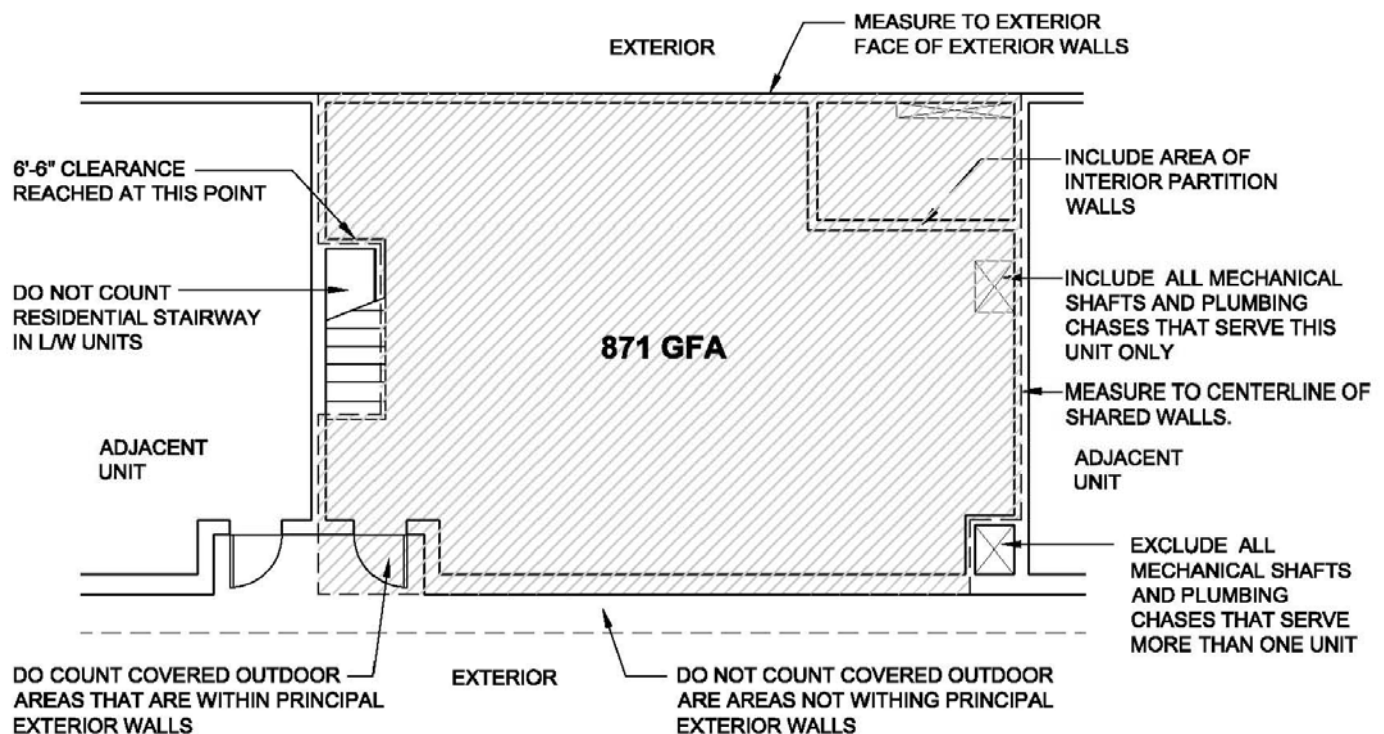
RTOR: (a) 18%

(b) 6%

## **RADIO SQUARE GROSS BUILDING FLOOR AREA CALCULATIONS**

## GROSS FLOOR AREA (G.F.A.)

TO BE USED BY TRAFFIC ENGINEER FOR TRIP GENERATION RATES OF EXISTING AND PROPOSED COMMERCIAL SPACES



### DEFINITION:

This definition of Gross Floor Area (GFA) will be used by the Traffic Engineer for the purposes of calculating the trip generation rates of the existing and proposed commercial spaces.

Gross Floor Area (GFA)[i]: The sum (in square feet) of the area of each floor level in the building, including cellars, basements, mezzanines, penthouses, corridors, lobbies, stores and offices, that are within the principal outside faces of exterior walls, not including architectural setbacks or projections. Included are all areas that have floor surfaces with clear standing head room (6 feet, 6 inches minimum) regardless of their use. If a ground-level area, or part thereof, within the principal outside faces of the exterior walls is not enclosed, this GFA is considered part of the overall square footage of the building. However, unroofed areas and unenclosed roofed-over spaces, except those contained within the principle outside faces of exterior walls, should be excluded from the area calculations. For purposes of trip generation and parking generation calculations, the GFA of any parking garages within the building should not be included within the GFA of the entire building. The unit of measurement for office buildings is currently GFA; however, it may be desirable to also obtain data related to gross rentable area and net rentable area. With the exception of buildings containing enclosed malls or atriums, gross floor area is equal to gross leasable area and gross rentable area.



ASSOCIATED  
TRANSPORTATION  
ENGINEERS

### GROSS SQUARE-FOOT MEASUREMENT DEFINITION

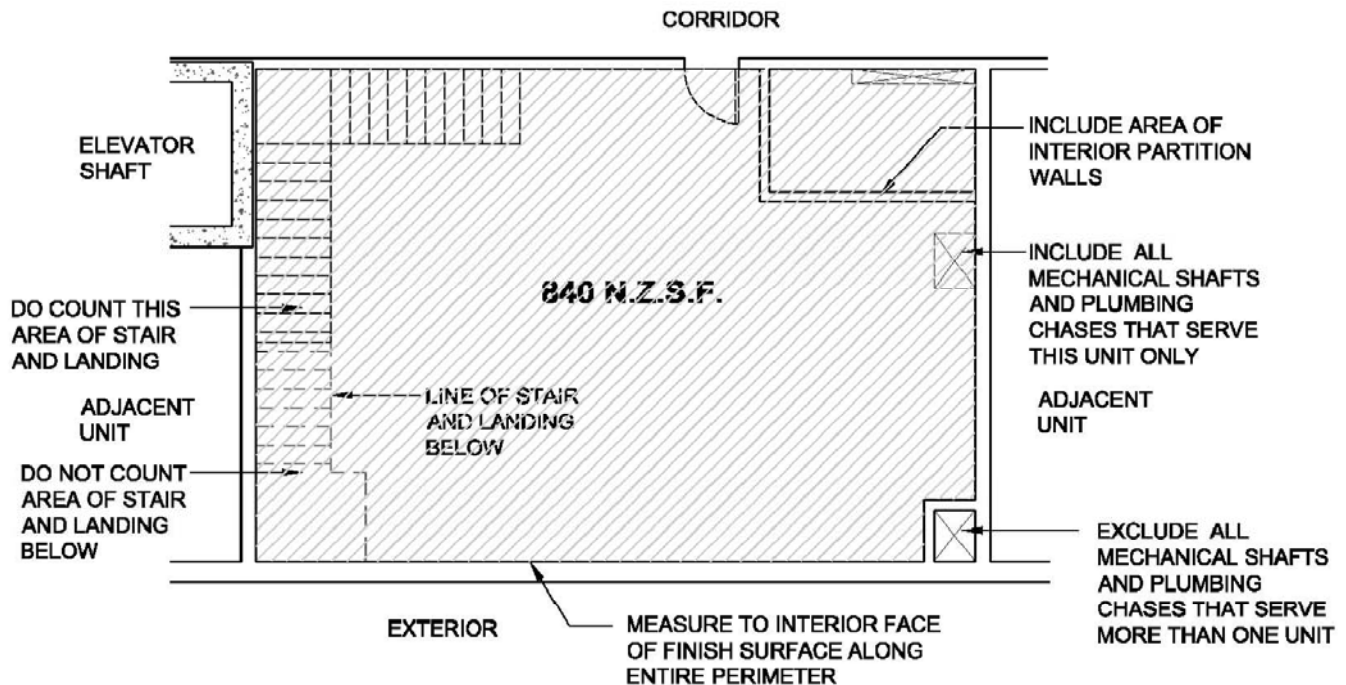
FIGURE

1e

JL #05166.01

## NET SQUARE FEET (N.S.F.)

NET SQUARE FEET USED IN PRT SUBMITTAL



### DEFINITION:

THIS DEFINITION FOR NET SQUARE FEET WAS USED IN OUR P.R.T. SUBMITTAL FOR THE OFFICIAL NET SQUARE FEET NUMBERS SUPPLIED TO THE CITY.

Do not measure any area under stairways, regardless of clearance height, even if it is useable as storage space or other useable space. In other words, count the area of a stairway only once, regardless of the number of floors it serves

Do count the area of vent / mechanical shafts and chases that serve this unit only. Do not count the area shafts that serve more than one units.

Round to the nearest square foot.



ASSOCIATED  
TRANSPORTATION  
ENGINEERS

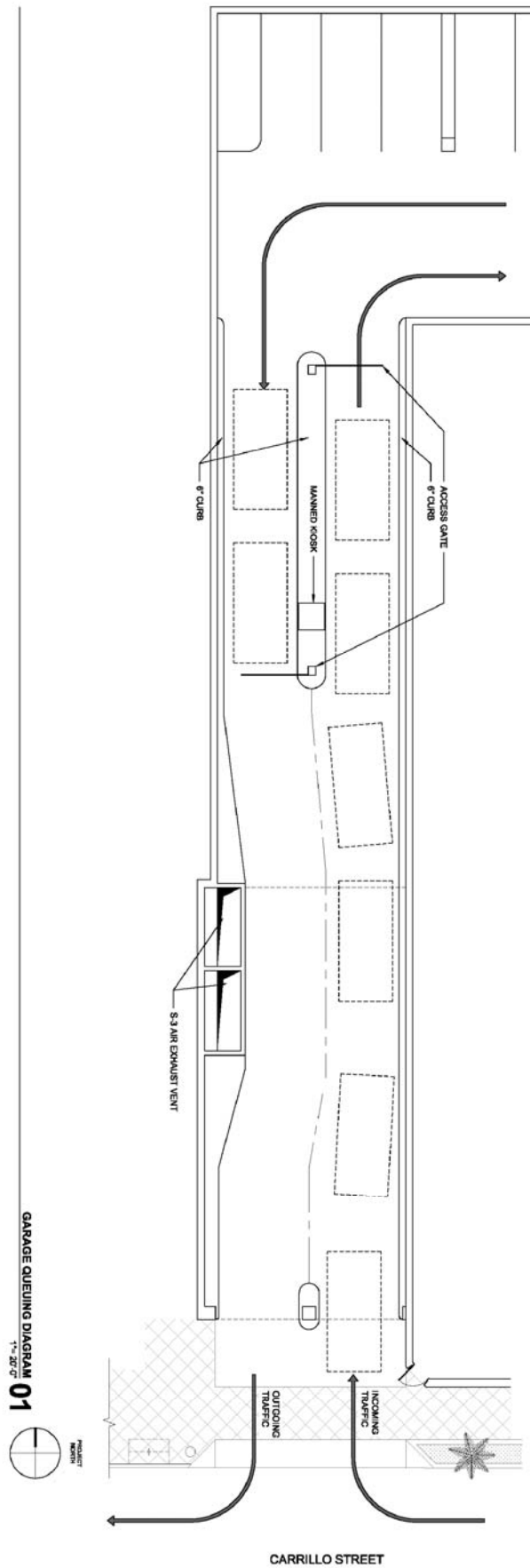
### NET SQUARE-FOOT MEASUREMENT DEFINITION

FIGURE

2e

JL #05166.01

## QUEUING CAPACITY DIAGRAM



# QUEING CAPACITY

FIGURE

3e

JL #05166.01



ASSOCIATED  
TRANSPORTATION  
ENGINEERS